

Name (PRINT) KEY

1. Which of the following are **even** numbers? [3 pts]

- I. The number of neutrons in a ^{31}P atom II. The number of protons in a ^{31}K atom
III. The number of electrons in a N atom IV. The atomic number of Zn
V. The number of electrons in an iron (II) ion, Fe^{2+}

- a) I and III b) III, IV, and V c) **I, IV, and V** d) IV only e) II and IV

2. Write formulas for the following compounds: [4 pts]

Name	Formula
tetraphosphorus decasulfide	P_4S_{10}
magnesium phosphate	$\text{Mg}_3(\text{PO}_4)_2$
chromium(VI) oxide	CrO_3
potassium cyanide	KCN

3. Name the following compounds. [5 pts]

Formula	Name
Na_2CO_3	sodium carbonate
FeCl_3	iron(III) chloride
CO	carbon monoxide
$\text{Cu}(\text{NO}_2)_2$	copper(II) nitrite
SF_6	sulfur hexafluoride

4. **True or False.** [3 pts]

- a) The mass of a neutron and the mass of a proton are nearly equal in mass.

TRUE

- b) The formula $\text{C}_6\text{H}_{12}\text{O}_6$ is an empirical formula.

FALSE, the empirical formula would be CH_2O .

c) A cation is an ion with a net positive charge.

TRUE

5. The imaginary element X has the following natural abundances and isotopic masses. What is the atomic mass of X? SHOW WORK! Circle the correct answer. [3 pts]

Isotope	Isotope mass	Abundance
${}^{24}_{12}\text{X}$	24.02 amu	30.0%
${}^{26}_{12}\text{X}$	26.10 amu	70.0%

$$(0.300)(24.02 \text{ amu}) + (0.700)(26.10 \text{ amu}) = 25.48 \text{ amu}$$

- a) 50.00 amu b) **25.48 amu** c) 12.00 amu d) 25.06 amu e) 24.64 amu
6. The element oxygen consists of three naturally occurring isotopes: ${}^{16}\text{O}$, ${}^{17}\text{O}$, and ${}^{18}\text{O}$. The atomic mass of oxygen is 16.0 amu. What can be implied about the relative abundances of these isotopes? [3 pts]
- a) The isotopes all have the same abundance (33.3%).
b) **The abundances of ${}^{17}\text{O}$ and ${}^{18}\text{O}$ are very small.**
c) More than 50% of all O atoms are ${}^{17}\text{O}$.
d) Almost all O atoms are ${}^{18}\text{O}$.
e) Almost all O atoms are ${}^{17}\text{O}$.

7. Calculate the **mass** (in g) of 0.00315 moles of krypton (Kr). [2 pts]

$$0.00315 \text{ mol Kr} \times \frac{83.80 \text{ g Kr}}{1 \text{ mol Kr}} = \mathbf{0.264 \text{ g Kr}}$$

8. One **mole** of iron (Fe) is? Circle the correct answer. [2 pts]

- a) is heavier than one mole of lead (Pb).
b) is 77.0 g of iron.
c) is 26.0 g of iron.
d) weighs the same as one mole of Pb.
e) **none of these**

9. At 7:30 this morning, gold was selling at \$26.29 per gram. If you have 8.75×10^{19} atoms of gold (Au), are you rich? More specifically, how many **dollars worth of gold** do you have? SHOW YOUR WORK!!! [4 pts]

$$8.75 \times 10^{19} \text{ atoms Au} \times \frac{1 \text{ mol Au}}{6.022 \times 10^{23} \text{ Au atoms}} \times \frac{196.97 \text{ g Au}}{1 \text{ mol Au}} \times \frac{\$26.29}{1 \text{ g Au}} = \mathbf{\$0.752}$$

No, you are not rich!

$$1 \text{ mole} = 6.022 \times 10^{23} \text{ particles}$$